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(54) Steam spray iron with separate water tank

(57) An iron 1 has a spray nozzle 24 and steam jets. The iron receives water from a separate water tank 3 via a water feed tube 2. The spray generation is achieved by a manually operable water pressurising means 23, the back flow of the pressurised water being prevented by valve 26.

The construction is such that when the iron is up-ended e.g. when temporarily not in-use, steam generation is not possible because valve 14 blocks passage 11 and the level of water in chamber 10 is below the entry point to steam valve 13.

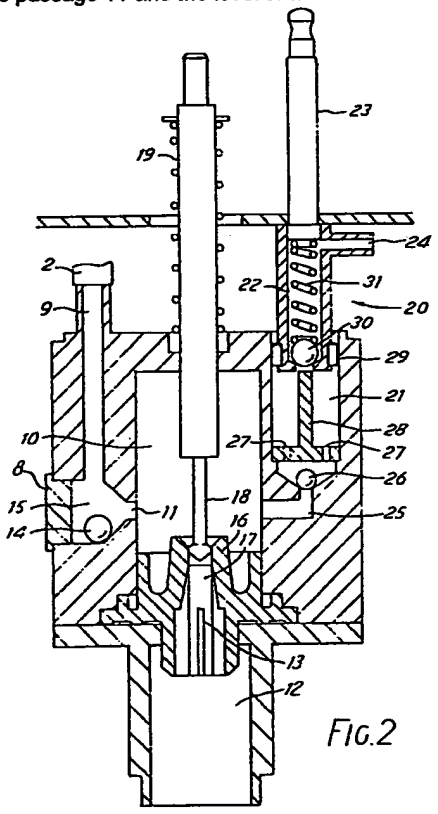

FIG.2

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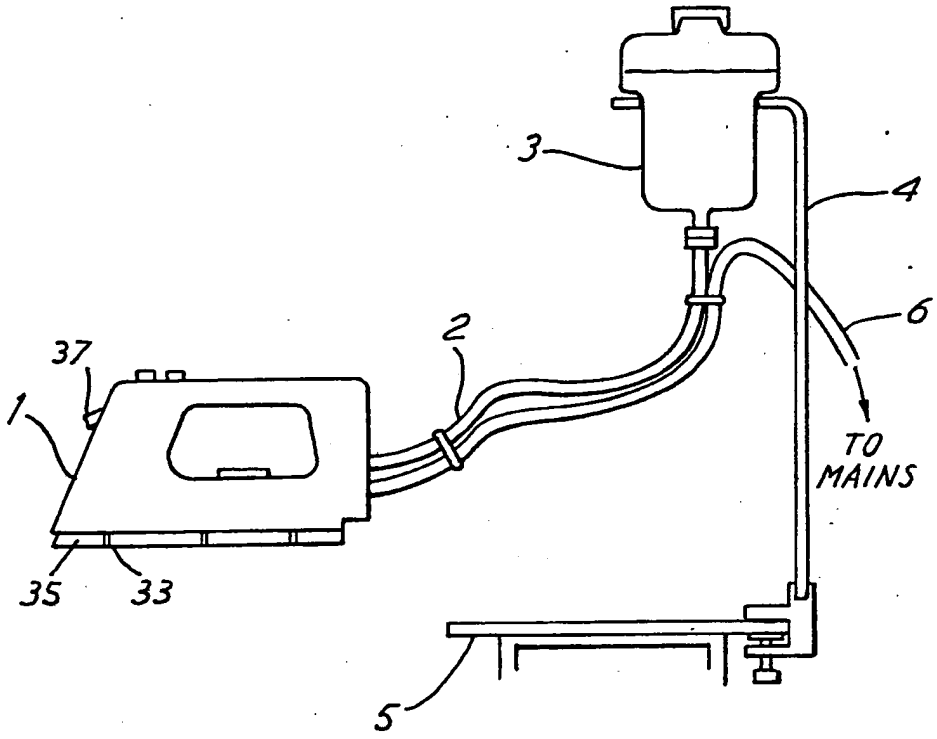

FIG.1

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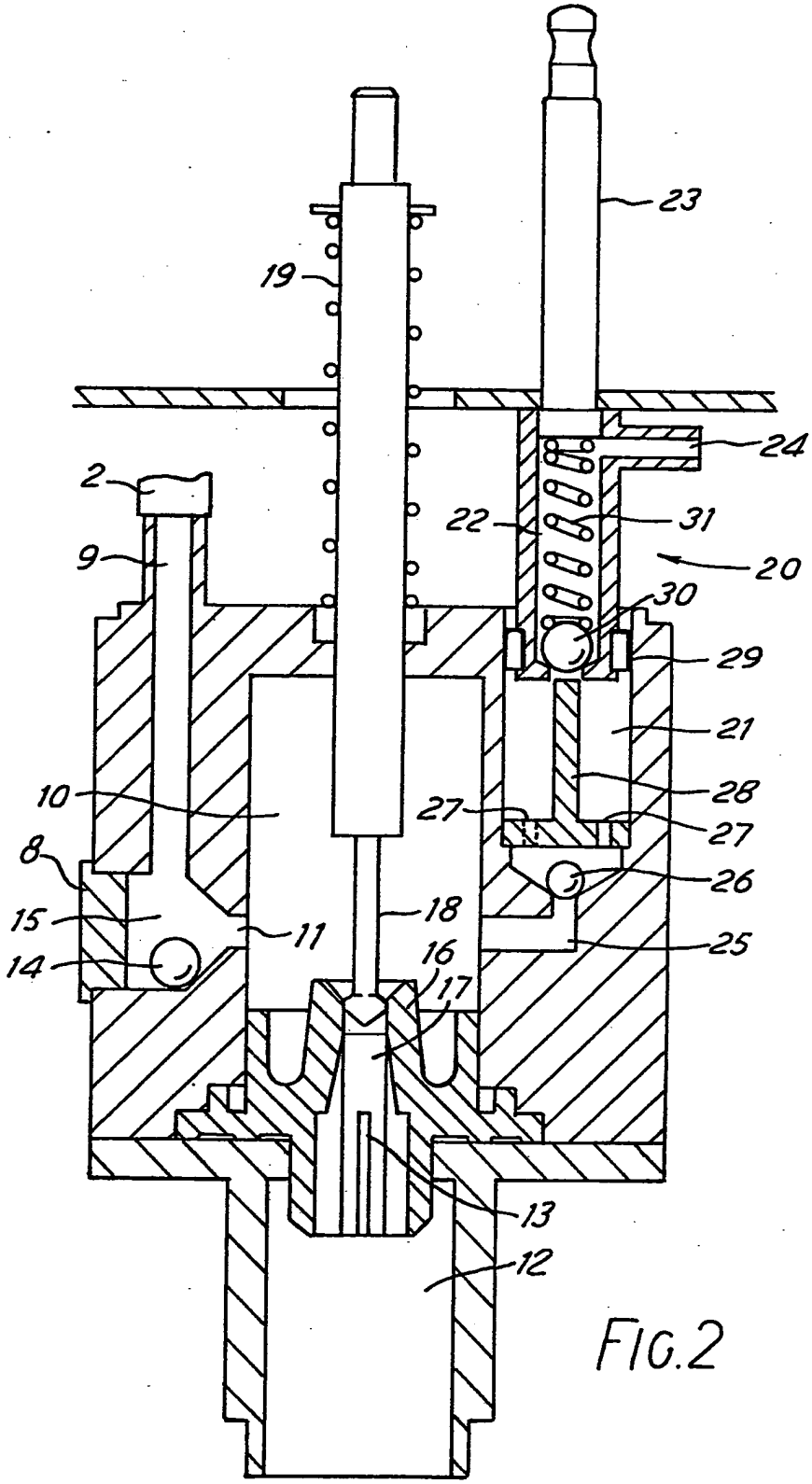

FIG.2

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IRONS

This invention relates to irons, in particular to irons of the kind having a separate water tank.

Known irons of this kind commonly comprise a high level water tank which, under gravity, supplies water to the steam chamber of the iron by means of a water feed tube. Sometimes a pump is provided to assist in the transfer of water from the tank to the iron.

A feature common to both gravity-fed and pump-fed systems is a manually-operable water control valve for controlling the flow of water from the tank to the steam chamber. Such valves are usually on-line valves placed in the water feed tube or at the point where the water feed tube connects to the opening to the steam chamber.

A disadvantage of prior art irons of this kind is that the pressure of the water fed to the iron is not great enough to enable a water spray to function. Even in the pump-assisted models, often the pressure is kept reasonably low to optimise steam production.

It is therefore an object of the invention to provide an arrangement to overcome this disadvantage.

According to the invention there is provided an iron for connection to a separate water tank, the iron comprising a water spray generating means with a chamber for receiving water from the water tank via a conduit in communication with the chamber, the spray generating means including a manually operable pressurising

means for supplying pressure on water in the chamber and means for preventing the flow of pressurised water back into the conduit so as to cause a flow of pressurised water to a spray nozzle.

The provision of a water spray with its own pressure generating means overcomes the problem hitherto associated with this kind of iron, namely insufficient water supply pressure to provide a water spray.

The means for preventing the flow of pressurised water back into the conduit suitably comprises a first movable means which is displaced by the water in the chamber into a position in which the first movable means substantially shuts off the chamber from the conduit when the pressurising means is activated.

In a preferred embodiment of the invention, the pressurising means is provided with a second movable means for preventing the flow of water from the chamber to the spray nozzle when the spray is not in use, and a projecting means within the chamber for displacing the second movable means when the pressurising means is activated, thereby to allow the flow of water from the chamber to the spray nozzle.

Such an arrangement may be simple, involving no complex engineering parts.

Preferably, in an iron with steam generation means the iron includes a steam generating chamber for receiving water from the water tank; and a position-dependent shut-off valve for preventing the flow of water to the steam generating chamber when the iron is positioned with the sole plate in a generally vertical orientation.

Accordingly, this arrangement can overcome the disadvantage of the provision of a single manually-operable control valve, namely that the user is unlikely to bother to turn it off every time he temporarily stops ironing, thus resulting in continued steam generation even when the iron is not in use.

Such a position-dependent shut-off valve acts to prevent the generation of steam when the iron is left standing on its heel but not actually turned off, for example during a temporary cessation in ironing. In prior art irons of the kind described above the user has to manually turn-off the water supply during every pause in ironing.

In a preferred embodiment of the invention the position-dependent shut-off valve comprises: a cavity connected to both the steam chamber and a water-feed tube for connection to the water tank; and a third movable means within the cavity which is movable to a position in which it substantially shuts off the cavity from the steam chamber when the iron positioned with the sole plate in a generally vertical orientation.

The advantage of such a shut-off valve lies in both its simplicity and efficiency; unlike most valves, no complex engineering parts are required and there is little frictional movement between the functional parts thus substantially removing the problems arising from wear that occur in most known valve systems.

To add to the simplicity and efficiency of the valve, the movable means is preferably a generally spheroidal object as such an object has the capacity to move more freely than an object of

any other shape.

In a further preferred embodiment of the invention a manually-operable variable steam valve is arranged to control the flow of water into the steam chamber.

Such an arrangement has the advantage that in addition to a shut-off valve, which prevents the production of steam in the iron during periods of non-use, the user may control the amount of steam produced by the iron during use.

Preferably, the water spray generating means and the steam generating means are connectable to the water tank by a single common connection.

Thus a convenient arrangement is provided whereby one connection from the water tank must be made by the user to provide water to both the steam chamber and the water spray generating means.

The present invention also provides an ironing system comprising an iron as hereinbefore defined, a water tank separate from but for connection to the iron by water-passage means for transferring water from the tank to the iron, whereby in use of the system the tank is positioned at an elevated position in relation to the iron.

One particular iron in accordance with the invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 shows an ironing system incorporating an iron in accordance with the invention;

Figure 2 shows a vertical cross-sectional view of part of the

iron of Figure 1 on an enlarged scale.

Figure 1 shows a steam iron 1 with a water feed tube 2 connected to a water tank 3. The water tank 3 is supported by a metal stand 4 which in turn is clamped to an ironing board 5 (shown partially). An electrical mains lead 6 connects the iron to the mains power supply. The steam iron has steam ducts 33 formed in its sole plate 35 and a water spray nozzle 37.

The high level water tank 3 gravity feeds water through the water tube 2 to the steam chamber and water spray nozzle 37 of the iron by means of the valve arrangement shown in Figure 2.

Referring now particularly to Figure 2, the valve arrangement comprises a position-dependent shut-off valve 8 connected to the water feed tube 2 by means of a conduit 9 and also to a water store 10 by means of an orifice 11. The water store 10 communicates with the entrance 12 of a steam chamber (not shown) by means of a manually-operable variable steam valve 13.

The shut-off valve 8 acts to prevent steam generation in the iron during short pauses in ironing when the iron would otherwise be in use, for example if the user up-ends the iron on its heel.

The shut-off valve 8 works as follows: when the iron is up-ended such that its sole plate 35 stands in a substantially vertical position, a ball 14 provided in a cavity 15 of the valve 8 moves so as to block the orifice 11. Thus water entering the conduit 9 from the water feed tube 2 is prevented from entering the water store 10 because the orifice 11 is blocked. Consequently no water can reach the entrance 12 of the steam chamber (not shown), regardless of whether the manually operable

steam valve 13 is open or not.

The provision of the manually operable control valve 13 allows the user to variably adjust the amount of steam generated by the iron during use. This valve takes the form of a needle value and consists of a nozzle 16 with a bore 17 and a needle 18 arranged for coaxial movement within the bore; the position of the needle 18 being controlled by a spring loaded knob 19. Part of the bore 17 in the region adjacent to the water store 10 is flared, the needle 18 having along its length a section of increased diameter. Thus control of the position of the section of the needle of increased diameter within the bore makes it possible to achieve a variable rate of water feed to the steam chamber and thus a variable rate of steam generation. Alternatively, a steam boost can be obtained by a sharp downward movement of the needle 18. The steam will be ejected from the iron via the steam ducts 35.

When the iron is up-ended and the automatic shut-off valve cuts off the supply of water to the water store 10, there may be however some residual water in the water store 10. To overcome this problem the water store 10 is shaped so that when the iron is up-ended in its resting position, the water level is below the entry point to the steam valve 13.

In addition to the automatic shut-off valve 8 and the manually operable variable steam valve 13, the iron is also provided with a water spray facility, achieved by the action of a spray mechanism shown generally at 20.

The spray mechanism 20 comprises a spray chamber 21, a

piston 22 and a control knob 23. The piston 22 is provided with a pipe 24 which is connected by some suitable means, for example conventional tubing, (not shown) to the spray nozzle 37.

The spray chamber 21 is connected to the water retaining chamber 10 by means of a conduit 25.

During operation of the iron, water passes from the water store 10, through the conduit 25 to the chamber 21. Although the water leaving the water store 10 is under some pressure as a result of the gravity feed arrangement, it is insufficient to generate a spray. The pressure of the water is sufficient to displace a ball 26, which resides over the exit point of the conduit 25. The water then fills the chamber 21 by passing through three holes 27 in the flanged bottom of a pin 28. Water is prevented from leaving the chamber 21 by a lip seal 29 and ball 30.

The spray mechanism 20 is activated by depressing the control knob 23 against the action of the spring 31. This moves the piston 22 downwards into the spray chamber 21, causing a build-up of pressure in the spray chamber 21 and fixing the ball 26 into the conduit 25, thus blocking off the conduit 25 from the spray chambers 21. Continued depression of the control knob 23 causes the pin 28 to lift the ball 30 allowing the water which has been pressurised in the chamber 21, by continued depression of the control knob 23, to escape through pipe 24. The pipe 24 is connected to the spray nozzle 37 by means of a tube (not shown) and thus the required water spray is produced when the control knob 23 is released and the piston 22 are returned to their

initial positions by the action of the spring 31, the ball 30 once more preventing the flow of water from the chamber 21 to the pipe 24.

It will be appreciated that whilst the use of gravity fed water is a particularly convenient arrangement, the invention is also applicable to an iron in which a pump is used to transfer water from the water tank to the iron.

CLAIMS

1. An iron for connection to a separate water tank, the iron including a water spray generating means with a chamber for receiving water from the water tank via a conduit in communication with the chamber, the spray generating means including a manually operable pressurising means for supplying pressure on water in the chamber and means for preventing the flow of the pressurised water back into the conduit, so as to cause a flow of pressurised water to a spray nozzle.

2. An iron according to Claim 1 in which the means for preventing the flow of pressurised water back into the conduit comprises a first movable means which is displaced by the water in the chamber into a position in which the first movable means substantially shuts off the chamber from the conduit when the pressurising means is activated.

3. An iron according to either of the preceding claims in which the pressurising means includes a second movable means for preventing the flow of water from the chamber to the spray nozzle when the spray is not in use and a projecting means within the chamber for displacing the second movable means when the pressurising means is activated, thereby to allow the flow of water from the chamber to the spray nozzle.

4. An iron according to any one of the preceding claims, including a steam generating means comprising a steam generating chamber for receiving water from the water tank, and a position dependent shut-off valve for preventing the flow of water into the

steam generating chamber when the iron is positioned with the sole plate in a generally vertical orientation.

5. An iron according to Claim 4 in which the position dependent shut-off valve comprises a cavity connected to both the steam chamber and a water-feed tube for connection to the water tank, and a third movable means within the cavity which is movable to a position in which it substantially shuts-off the cavity from the steam chamber when the iron is positioned with the sole plate in a substantially vertical orientation.

6. An iron according to any one of Claims 2, 3 and 5, in which the moveable means is spheroidal.

7. An iron according to Claim 4 or Claim 5 including a manually operable valve arranged to control the flow of water into the steam chamber.

8. An iron according to Claim 7 in which the manually operable valve comprises a needle valve.

9. An iron according to Claim 8 in which the needle valve includes a nozzle with a bore effective to allow entry of water into the steam chamber, the bore having, in the region of the bore remote from the steam chamber a flared section; a needle capable of coaxial movement within the bore, the needle having along its length a section of increased diameter, the movement of this section in relation to the surface of the bore being such as to achieve variable water feed to the steam chamber.

10. An iron according to any one of Claims 5 to 9 in which the spray generating means and the steam generating means are connectable to the water tank by a common connection.

11. An iron substantially as hereinbefore described with reference to the accompanying drawings.

12. An ironing system comprising: an iron according to any one of the preceding claims, and a water tank separate from but for connection to the iron by water passage means for transferring water from the tank to the iron, whereby in use of the system the tank is positioned at an elevated position relative to the iron.

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